ARCHAEOLOGICAL SURVEY AND TESTING OF THE ST. CROIX RIVER AND SPEDNIC AND PALFREY LAKES NEW BRUNSWICK - 1984

by

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1985

ISBN O-88838-340-1

PUBLISHED BY:

Archaeology Branch
Department of Historical and
Cultural Resources
P. O. Box 6000
Fredericton, N.B.
E3B 5H1

PUBLIÉ PAR:

La Direction de l'Archéologie
Ministère des Ressources
historiques et culturelles
C. P. 6000
Fredericton, N.-B.
E3B 5H1

ACKNOWLEDGEMENTS

The 1984 St. Croix River drainage and Spednic and Palfrey Lakes survey and testing program was sponsored by the New Brunswick's Community Improvement Corporation and the province's Department of Historical and Cultural Resources, Archaeology Branch. As a portion of the management plan for the Canadian Heritage River System Program, funding for this study has been provided by the Government of Canada and administered through Parks Canada.

During the course of this survey, residents of Charlotte County and York County, New Brunswick welcomed the survey team with friendship and warm hospitality. Individuals were more than willing to show us their private collections of artifacts. During phase two, Bliss Goodwin was our informative "guide" on the lakes. Georgia-Pacific Corporations, the major landowner in the area surrounding the lakes allowed us to trespass on their property.

During the project many individuals were generous in sharing their expertise. I wish to thank Dr. Christopher Turnbull, Patricia Allen, Dr. Michael Deal and Albert Ferguson for professional advice and assistance, Fidèle Thériault for historical research on Skedaddle Ridge, Angel Gomez-Miguelanez for drafting, Beth Armstrong-Bewick for photographs and proof reading, Wendy Heenan for taking care of our financial concerns, and Laurie Robichaud for typing the manuscript. Last but certainly not least, I wish to express my deep appreciation to my husband and survey partner, R. Scott Finley for his immeasurable contributions during the field season and report writing.

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INTRODUCTION

The recent designation of the St. Croix River as a recreational waterway and nomination as a Canadian Heritage River has brought about a flurry of archaeological activity (Allen 1983 Deal 1984 a,b,c, Kopec 1984) in efforts to protect and promote awareness of New Brunswick heritage (Allen 1983a). The goal of the 1984 archaeological survey and testing program was to assess existing archaeological resources, continue the inventory of sites and identify areas of archaeological concern for future investigation.

STUDY AREA

The study area was the St. Croix River and Spednic and Palfrey Lakes in southwestern New Brunswick. Boardman (1903:12) refers to the St. Croix River as a "lake in motion". The St. Croix River provides a transportation link between the coast and interior (Figure 1).

The 1984 archaeological survey and testing project was divided into two geographic phases. Phase one (Figure 2) was the Canadian shore from St. Croix Island to Upper Mills in Charlotte County (1:50,000 scale topographic map 21G/3 St. Stephen). This portion of the St. Croix River is a tidal estuary up to St. Stephen with several access roads. Route 1, 127, 765 and the Ledge Road provide access to the phase one study area. Several cottage roads branch off the main routes listed above. Phase two (Figure 3) was the Canadian shoreline of the St. Croix River from St. Croix up to and including Palrey and Spednic Lakes in York County (1:50,000 scale topographic maps 21G/11 west half McAdam, 21G/12 east half Forest City). Spednic Lake is the largest of sixty lakes draining into the St. Croix River (Davis 1950). This area is more sparsely populated than the phase one portion of the study area. There are few access roads to the shoreline. Highways 3 and 4 allow limited access and Georgia-Pacific Corporations have an extensive network of logging roads in the area.

METHODOLOGY

An experienced survey team operated from base camps on the Waweig River during phase one and in the village of St. Croix and on Spednic Lake during phase two. A boat with a 9.8 horsepower motor was used in the first phase for preliminary reconnaissance and initial assessments of areas for archaeological potential during high tide while foot survey was the optimal method for examining exposed beaches and eroded bank edges during low tide. Phase two was conducted in the fall (September and October) during a season of lower lake levels as recommended by Allen (1983). The canoe proved more useful in Palfrey Lake, because of hazardous boulders protruding from the lake bottom. Spednic Lake was largely inaccessible by road and far too extensive for canoe survey so the motor boat was used with caution, to spot check several areas. Archaeological sites were surface collected and then shovel tested. Areas of high potential were tested more extensively using 1.0 x 1.0 meter test squares excavated by trowel and screened through ¼ inch (.6cm) mesh. During phase one, column samples were collected from shell middens for botanical and faunal analysis and radiocarbon dating. Due to the lack of soil matrix in phase two, it was only possible to surface collect. Maritime Archaeological Resource Inventory forms were completed for all sites to record environmental and locational data relevant to specific sites. Polaroid photographs were attached to these forms and slides were taken

with a 35mm Nikormat camera. When possible, local collectors were interviewed and their collections photographed. Sites were assigned Borden numbers and plotted on 1:50,000 scale topographic maps. An aerial examination of the St. Croix Waterway and the lakes was undertaken after the field season to help formulate recommendations about the archaeological potential of the unexamined areas and provide an overview of the study area.

PHASE ONE

ENVIRONMENTAL BACKGROUND

The St. Stephen area has moderately rolling topography characteristic of the glaciated Acadian and Appalachian regions. Numerous hills and ridges extend across the western half of Charlotte County (Wicklund and Langmaid 1953) not rising more than 50-100 meters above the intervening wide valleys (Thibault 1982:3). The coastline is generally rugged with many small mountains reaching as high as 200 meters. Coves, inlets and bays provide ready access to land (MacKay et al 1978).

The palynological sequence is summarized by Mott (1975) and Bradstreet and Davis (1975) for the entire post glacial period. Present day trees are typified by the Spuce-Fir zone (Loucks 1962). Trees tend to be somewhat stunted (McCormick 1980:31) because of strong winds (Loucks 1962:42) and perhaps

from salt spray, although inland ridges exhibit similar damage (Ibid:144). Where timber resources have been depleted by forest fire, blueberry barrens have developed (Wicklund and Langmaid 1953:2). Refer to Hinds (1983) for an up to date and comprehensive summary of the coastal forest.

The soil type in phase one of the study area is Carleton Shaly Loam (Ibid:25). Soils range from coarse sandy loam to clay loams (Loucks 1962:144, Wicklund and Langmaid 1953:25) while coarse sandy loams are loose and porous, clay loams may be compact and sticky (Wicklund and Langmaid 1953:25). Soils are generally shallow and bedrock is often exposed (Loucks 1962:144). Large stones and boulders are nearly always present (Wicklund and Langmaid 1953:26).

The St. Croix River follows an irregular path marked by lake basins, sharp channel bends and a falls near its mouth. The preglacial St. Croix may have taken a more southeasterly route to Passamaquoddy Bay, continuing into Maine via Upper Mills in a valley now partially filled by glaciofluvial sediments (Thibault 1982:4). The main features of the St. Croix River were probably shaped by ice. By 12,000 B.P. ice had receded enough to expose southern New Brunswick. Sea levels were as much as 80 meters lower than present (McCormick 1980:24) rising up to 75 meters higher than present (Grant 1971) as the ice cap started to melt. As the land rebounded from the weight of the

glacier, the sea level decreased to about 20 meters below modern levels thus adding a 25 km extension to the present day shoreline (McCormick 1980:24).

By 6-8000 B.P. this process was reversed and the coastline began submerging again (Grant 1970, 1977). As data continues to accumulate for the last 8,000 years, the environmental mosaic becomes more clear. Since 6,000 B.P. (McCormick 1980:29, Speiss et al 1983, Hammon 1984:18) increasing tidal amplitude and decreasing water temperature in the Bay of Fundy have allowed for the development of mudflats in which clams adapted to cold water could flourish (Sanger 1975). By, at least 3,000 B.P. there was an increase in the clam population of the Passamaquoddy Bay. It would seem possible that a series of worldwide and local conditions may have led to a cooling environment in the Passamaquoddy Bay area in addition to an excitation of the marine and intertidal environment (McCormick 1980:29).

Marine deposits occur in Oak Bay, and along the St. Croix River (McCormick 1980:24) except for Todds Point and Hills Point which are characterized as ground moraine (MacKay et al 1978:17). The Oak Bay Fault is the most prominent fault in this portion of the study area (Cumming 1967, Ruitenberg 1968, Thibault 1982). Complete glaciation during one or more stages of the Pleistocence epoch is illustrated by abundant evidence of glacial abrasion and deposition.

The principal direction of the ice flow is recorded by southeasterly trending drumlins, drumlinoid ridges and by striations (Thibault 1982:6).

The bedrock is of sedimentary origin and consists of greywacke, slate, siltstone, sandstone, and quartzite of Palezoic age. Felsic and mafic intrusive rocks are part of the St. Stephen igneous complex of Ordovician age (Ruitenberg 1967).

At present, the principal mudflats in the study area are in the Upper Estuary of the St. Croix River, Oak Bay and Waweig River. More than half of the flow of freshwater into Passamaquoddy Bay is contributed by the St. Croix River. The average depth is 13 meters below low water with channel depths of 35-40 meters. The estuary's great tidal amplitude (6 meters), large intertidal zone (approximately 10 square kilometers) and convoluted shoreline allow a variety of species to exist in close proximity, a situation ideal for human exploitation (McCormick 1980:47). Birds (Christie 1983), marine mammals (Gaskin 1983), fish (Scott 1983), shellfish (Thomas, Arnold and Taylor 1983) and land mammals are all available in the St. Croix River Estuary.

PHASE ONE

ARCHAEOLOGICAL BACKGROUND

The history of archaeological activity in the phase one portion of the study area begins with a boundary dispute between Canada and the United States in the late 1700's. The disagreement arose over the exact location of the St. Croix River. The Americans maintained that it was the Magaguadavic River. Canadians solved the problem by providing information on the ruins of Champlain's 1604 settlement on St. Croix Island (Gruber 1969). A century passed before S.F. Baird from the Smithsonian Institute undertook a survey of shell middens in New Brunswick and New England (Baird 1881). Baird's studies in the Oak Bay region will be referred in more detail in the discussion on BhDt-4. After Baird, others visited the area within the wider realm of provincial surveys (Ganong 1899, Stoddard et al 1952, Zaborski 1955, Erskine 1968) and some small scale archaeological investigations (Pearson 1970) were carried out.

As mentioned in the environmental background, the St. Croix River flows into Passamaquoddy Bay. The Bay has been the scene of a great deal of archaeological research (Matthews 1884, Sanger 1971a, 1971b, 1976, 1977, 1979, 1982, Pearson 1970, Lavoie 1971, Davis 1978, Simonson 1978, 1979, Ferguson and Turnbull 1980, Davis and Christianson 1981, Wherry 1981, Bishop 1980, Bishop 1983, Black 1984, Hammon 1984).

The exploitation of abundant coastal resources by prehistoric peoples in the study area began about 3000 years ago. Whether the coastal adaptation was "introduced full bloom from further south via an immigration or a diffusion of techniques to indigenous populations or a combination of both (Sanger 1971:13) is a problem which remains unsolved at present. Shell middens provide for the excellent preservation of organic materials. "Calcium carbonate rich shells create a basic environment" (Sanger 1982:197) which is a direct contrast to the acidic soils generally encountered on New Brunswick's interior sites. This preservation factor has enabled research to focus on seasonality. Faunal analysis (Lavoie 1971, Stewart 1974, Burns 1978, Bonnichsen and Sanger 1977, McCormick 1980, Black 1982, 1983, 1984, Salvaggio 1984) on several shell midden sites in the Passamaquoddy Bay area has led to some controversies about seasonality. Growth increment analysis on soft shelled clams Mya arenaria in Maine has provided yet another method for determining seasonality (Hancock 1982). From this expanding data base on seasonality, it has become apparent that a "neatly dichotomized seasonal round based on ethnohistorical data" (Sanger 1982:202) did not exist in the prehistoric past. Hunter-gathers scheduled settlement to optimize exploitation of a variety of resources from their environment.

Coastal erosion poses a serious threat to historical and cultural resources in the study area (Turnbull 1979, Davis and Christianson 1981). Simonson (1978, 1979) outlined a management plan for the coastal resources of the Maritimes. At Minister's Island (BgDs-10) a sea wall was constructed to protect the site from erosion (Ferguson and Turnbull 1980). Southerly winds create waves of considerable force as they build along the sweep of Passamaquoddy Bay and up the St. Croix River. The erosive effect of wave action is felt at all exposed areas (MacKay et al 1978:28). As previously discussed, tides and coastal submergence also contribute to erosion. (Plate 3)

Most of the prehistoric occupational evidence of the phase one portion of the study area and neighbouring Passamaquoddy Bay spans the last 2-3000 years or Ceramic Period. Recently, palaeo Indian evidence has been recorded near Calais, Maine (United States) (Bonnichsen et al 1983). The fluted points are stylistically different from others found at palaeo sites in Maine (Vail Site), Massachusetts (Bull Brook) and Nova Scotia (Debert) but similar enough to represent a regional variant (Ibid). With more discoveries of palaeo evidence, archaeologists may be able to fill in some of the chronological gaps and continue to reconstruct lifeways of prehistoric peoples to provide a more clear interpretation of the past.

PHASE ONE

ARCHAEOLOGICAL ANALYSIS

Eight sites were recorded and assessed during the 1984 survey and testing program. Three historic sites are discussed in more detail in the following section. Only one shell midden, out of four recorded, was substantial enough for testing. Faunal and botanical, lithic, and ceramic analysis were undertaken on small samples from the Simpsons Farm Site and compared to information previously recorded by Baird (1881). Natural and cultural disturbances had virtually destroyed the archaeological potential of the three other shell middens and BhDt 3. No future investigations are recommended for this portion of the study area with the possible exception of BhDs 3, which may warrant further investigation.

Hills Point Depression BhDs 3

This site may represent the remnants of an Acadian settlement mentioned by Ganong (1899), but test units and subsequent analysis of material culture do not support this possibility. Erskine (1968) suggests that "sites were known along the stretch leading to the hill of the point and that one was dug by Americans long ago". No evidence of these sites was encountered either. The point can be accessed by a rough track which appears to have been used recently for some small scale logging operations

Rickets Island BhDs4

This historic site yielded nineteenth century hand painted ceramics in the first test unit. Subsequent test units lacked evidence of material culture. It is possible that this island in the Waweig River, joined by a gravel bar to the mainland at low tide was a picnic site in the past. The Bar Road which links Minister's Island in Passamaquoddy Bay to the mainland is a favourite clam digging and picnicking spot for locals and tourists in the summer months. A walking survey revealed no other historical or archaeological sites on the island's beaches and erosional banks.

Donald Farm and associated cemeteries BhDt8

Only the foundations remain from the Donald farmhouse built circa 1830. The present property owners, Bob and Edna Mallory, showed us the graves of two members of the Donald family killed in a smallpox epidemic. A larger cemetery somewhat overgrown is located just across from the Mallory property on the Donald Road. This complex of burial sites is in no danger from erosion and the present landowners will probably continue to protect it.

Simpsons Farm

BhDt-4

This shell midden was called Simpsons Farm (Baird 1881, Ganong 1899, Stoddard 1955, Zaborski 1955, Joudry 1955), Bailey's Farm (Joudry 1955, and records at Historical and Cultural Resources, Archaeology Branch and the New Brunswick Museum) and Cameron Farm (Erskine 1968) after respective property owners. BhDt 4 is located on the eastern side of Oak Bay approximately thirteen kilometers northeast of St. Stephen, New Brunswick (Plate 4). The site was initially recorded by Baird who described Oak Bay as a

> narrow fiord, extending northward from Passamaquoddy Bay, the water being entirely salt. The tides are very high, and a vast extent of flats are exposed at low water, still abounding in the soft clam. The area of the shellbed appears to be one acre (Baird 1881:292-3).

In the early 1900's Bailey conducted a "dig" on a portion of the site where a road was going through to provide access to Oak Bay and donated a collection of 229 artifacts to the New Brunswick Museum. Unfortunately no further record remains of these artifacts. Several others visited the site (Stoddard et al 1952, Zaborski 1955, Joudry 1955, Erskine 1968) but only locational data was noted with a few exceptions.

Baird was the most meticulous in his records concerning the site. He profiled the midden and observed that it was 122 cm (48 in) deep with thirteen discernable stratigraphic units. He noted an abundance of sea urchin spines and shells on the site. He interpretated ashes as the remains of eel-grass used to wrap shells for cooking.

The sea urchin Strongylocentrotus droebachiensis can be harvested by dragging. Their gonads are considered a delicacy in Japan where they are compared to caviar (MacKay 1976).

A variety of molluscs were recorded by Baird (1881). Few are represented on the site today. Two species of gastropods, the waved whelk and moon shells are discussed first. Then four species of pelecypods are described.

Buccinum undatum - waved whelk

This is probably the species encountered by Baird and still evident in recent testing of the site. The waved whelk is a voracious scavenger and a frequent robber of fishermen's bait (Morris 1951). Black (1983) suggests that a concentration of large whelks may be useful in identifying cultural hiatuses because he hypothesizes that adult whelks, resulted from bird predation while juvenile whelks are gathered at the low water line for human exploitation. Whelks may have been procured unintentionally with the main course.

Natica heros - moon shells

These carnivorous shellfish are often found in the stomachs of cod and other fish.

Pecten grandis - deep sea scallops

This species was recorded by Baird (1881) as Pecten tenuicostatum. Shells of this scallop are often 15-18 cm across and were used by historic Indians as dishes (Morris 1951).

Pecten irradians - scallop

This species is commonly found living in eel-grass. The disappearance of eel-grass leads to a corresponding scarcity of scallops (Morris 1951).

Mytilus - mussels

The mussel shell is more fragile than other shells and often does not survive at the archaeological site.

Mya arenaria-soft shelled clam

This species is also called the long clam, steamer clam, long necked clam. It lives in the muds and gravels between tides, where it is partially exposed to the air twice a day. This

was the primary species encountered during the 1984 survey and testing of BhDt 4. A sample of this shell was radiocarbon dated to 740± 60 B.P. (Beta 11067).

A small sample of mammal remains was collected in 1984. Gwyn Langemann, Simon Fraser University was contracted to analyse the sample. The presence of four species was demonstrated.

Castor canadensis - beaver

Beavers do not hibernate in winter, but remain active beneath tne ice and in their lodges. Their favourite food is the trembling aspen. Their diet is enhanced by eel-grass, water lilies and cat tails (Banfield 1974:158-60). Beavers could be trapped year round because of the high visibility of their lodges and dams. Incisor tools, clothing and food could be obtained from the beaver. Pearson (1970:188) notes an increase in the importance of beaver in the Ceramic period diet. Recently in Maine it has been suggested that the Europeans tapped a pre-existing late Ceramic period fur trade.

Ursus americanus - black bear

Bears are solitary animals with a brief pairing at mating season. They hibernate from October to April but can be awakened by shouting. Their flesh is palatable and their hides can be processed to make robes or rugs (Banfield 1974). The

element representing the bear is a phalange which may indicate that the bear's hide was on the site since phalanges would not provide any great source of meat. Bears played an important role in the mythology of the Micmac and Maliseet (Speck 1938). Bear bones were treated with respect. They were not given to dogs or thrown into the water (LeClerq 1910:226) or burnt (Denys 1908:430). Bears were generally hunted in their dens in winter or by following their tracks to foraging areas where they might be caught off guard.

Alces alces-moose

The moose is referred to as the mainstay in the larder of trappers and Indians. The hide provides excellent outer clothing gloves, leggings and moccassins. In winter moose inhabit hardwood slopes, but in summer they remain close to lakeshores and alder swamps (Banfield 1974:396),

Canid, probably canis familairis - dog

One carnassial tooth may represent a dog on the site. Dogs were eaten and used in the hunting of other animals especially as mentioned in tracking the bear (Denys 1908).

The mammal sample was small and the minumum number of individuals was no greater than one for any species. The element count was highest for beaver. No bone artifacts were encountered. The mammal species represented provide no data on seasonality.

Fish (osteichthyes) analysis

One fish vertebra was identified by Frances L. Stewart, University of New Brunswick. The atlas vertebra of a flatfish (order - Pleuronectiformes, family Bothidae or Pleuronectidae) is represented. These fish have a cold-water origin and spawn during the early spring. Apparently Charlotte County waters have been documented as a highly productive fishery yielding 147 lb/acre compared to 33 lb/acre for the Digby waters of Nova Scotia. The reasons advanced for such a rich yield are the combination of heavy freshwater discharge, cold salt water and strong tides for mixing (Scott 1983:156).

Botanical analysis

Dr. Hal Hinds analyzed the seeds from the site and identified one seed to species chenopodium album. Commonly referred to as lamb's quarters or pigweed, this weed's seeds can be boiled to make a gruel or ground into flour. The seeds are available from fall to early winter (Peterson 1978:152). One must be cautious in formulating seasonal inferences based solely on the presence of these seeds since they could easily have been harvested and stored for future use. Also it is inadvisable to assign seasonality to this site on the basis of a single seed. Seeds of the same species were also present at the Mud Lake Stream site on Spednic Lake (Deal 1984c) and the Oxbow Site in northeastern New Brunswick (Allen 1983b)

Ceramics

Ten ceramic fragments were collected during testing of the site in 1984 (Plate 5). Five exhibit large punctates around the rim which is approximately 14.8 cm thick. Shell temper has been used in their manufacture. A straight stick, bone or paddle has been used to produce the cordwrapped stick pattern with an S twist (Peterson and Hamilton 1984). The sherds are similar to what Bourque describes as Grindle ware in New England (Snow 1980). Pottery with a comparable radio-carbon date was excavated on the Tracadie River in northeastern New Brunswick (Keenlyside and Buxton-Keenlyside 1976). In a 1954 visit to the site, Joudry (1955:96-97) described a crushed pot at a depth of 25.4 cm (10 in) which appears to have been similar to the ceramics collected on the site recently.

Five sherds are much thinner and appear to have been from a juvenile pinch pot (Allen pers comm). The ceramics are characteristic of the late Ceramic period.

Lithics

Two projectile point tips of cherty gray quartzite and low grade jasper were encountered during testing. One is broken at the notch on one side and is probably from the late Ceramic period. Nineteen flakes of basalt, quartz,and quartzite were also collected.

SUMMARY

BhDt4 has almost eroded away. The maximum depth of the shell midden recorded in 1984 was 50 cm. This suggests approximately 60% of the site has been eroded since Baird's reconnaisance over a hundred years ago. The site exhibited far less species diversity in 1984 than in 1869. New Brunswick's first shell date revealed that the site was occupied around 1210 AD during the late Ceramic period.

West Side Oak Bay Site BhDt6

The site is a small shell midden primarily composed of Mya arenaria, soft shelled clams which may be the remains of a baiters mound. The site is on the west side of Oak Bay as its name indicates, just northwest of Spoon Island. A fringe of shell on the tip of the point is all that remains of the site at present.

Bay View Midden Site BhDt 7

This is another shell midden which is almost eroded away. The site also appears to have been relatively small. The midden is located on the east shore of Oak Bay, northeast of Spoon Island. Organic deposits are very shallow and the shell is broken into tiny fragments. Faunal analysis of a tiny sample from the site revealed the presence of moose (Alces alces),

beaver (Castor canadensis) and two unidentified fish elements . There are cottages on either side of the site. The present day clearing of the forest floor and the resulting brush pile protect the site somewhat from the elements but the site appears to be too eroded to warrant future investigation.

Gilman Farm Site BhDs2

The remains of this shell midden are evident in the present property owners' garden (Plate 6). A large black organic and comminuted shell stain is all that remains of this midden which has been ploughed repeatedly. Flakes, surface collected at the site, attest to a prehistoric occupation but the site has been disturbed too much by the plough to warrant further investigation.

Salmon Falls BhDt 3

This site was rumoured to have been an Indian burial, but attempts to locate the actual site were inconclusive. The site is at the falls on the St. Croix River in Milltown, New Brunswick. Disturbances associated with the construction of a cotton mill on the site in 1881 and its eventual demolition have obscured evidence of an earlier occupation. At present, a New Brunswick Power station and fish ladder are on the site location. Erskine (1968) suggests that the first rapids below the falls would have been the main salmon spearing site. From

the scene of these rapids to Buchanon Hill or behind the present land registry office there are flat terraces covered with blackberries, raspberries, blueberries and choke cherries which may have been ideal for campsites but no traces of prehistoric occupation exist. Erskine also noted the presence of numerous trenches which he thought others dug in search of artifacts. Dan Breshnahan discovered two projectile points while collecting black earth for his violets (Plate 7). These points were the only artifacts examined relating to the native occupation of the site although the area was surveyed and shovel tested. One point is made of basalt and is corner notched while the other is a low grade jasper with less prnounced corner notching. They indicate a late Ceramic period occupation and are considered the most recent type of projectile point (Davis 1978, Sanger 1979, Allen 1981, 1983a).

PHASE TWO

ENVIRONMENTAL BACKGROUND

The phase two portion of the study area (Figure 3) "exhibits a rugged, rolling topography" (Seaman 1982:5). The surface of the region is undulating and littered with glacial erratics. submerged boulder reefs like the one at Palfrey thoroughfare make water transportation hazardous (Plate 8).

The north south orientation of the lakes accomodates extreme wave action even during the slightest storm. Both Canadian and American shores are eroded (Allen 1983a, Kopec 1984). The lake levels are artificially controlled to aid the forest industry. A series of dams occur at Forest City, Mud Lake, and St. Croix within phase two of the study area. The average lake depth is only five meters with a maximum depth of 20 meters (Allen 1983:3). In the late fall, former land masses emerge since water levels vary as much as five meters (Ibid).

Mott (1975) uses palynological studies to illustrate a vegetational sequence for the study area. After the ice retreated, tundra covered southwestern New Brunswick. Eventually trees invaded and became established. Climatic fluctuations encouraged the proliferation and domination of certain species during particular time periods. A cooling trend over the last one thousand years has allowed for the development of our modern forest. The study area is in the Acadian Forest Region (Hosie 1969). There is a predominance of tolerant hardwoods and a lengthy fire history (Rowe 1972, Loucks 1962).

The dominant soils are humo-ferric podzols, leached soils which are strongly acidic with a distint accumulation of dark organic material (Rowe 1972, 125, 164). The most common soil is Carleton Shaly Loam. Excessive amount of stone reduce its agricultural value especially along the lake shores (Ganong

1904:Map 4, Wicklund and Langmaid 1953). These soils are susceptible to strong sheet erosion on slopes unless preventative measures are taken in tillage methods (Brookes 1972:31) Logging operations in the phase two study area have resulted in the accumulation of materials of high organic content and "silting up" in some backwater waters.

Bedrock geology of the study area is described as Devonian (Wicklund and Langmaid 1953:9, Seaman 1982:8). The area reveals a glacially deranged drainage pattern characterized by a multitude of ice-scoured and drift dammed basins occupied by lakes and bogs. Drainage is predominantly southwards via the St. Croix River (Seaman 1982:8).

Complete glaciation of the area is illustrated by the abundant evidence of glacial abrasion and deposition (Ibid:9). Total deglaciation was probably completed by 12,000 B.P., although there is some controversy as to when the process actually began (Scott and Medioli 1980, Gadd 1973, Stuiver and Borns 1975).

As Allen (1983a:3) notes wildlife thrives in the sparsely populated "shores of Spednic and Palfrey Lakes. There are a few outfitting camps on the lakes which cater to sports fishermen and hunters. Moose, deer and bear are the large game animals favoured while landlocked salmon and smallmouth bass appeal to the fishermen. Waterfowl inhabit the marshy areas

adjacent to the lakes. The lakes are considered moderately warm with temperatures of 21°-23°C during the summer months (Ibid:4).

PHASE TWO

ARCHAEOLOGICAL BACKGROUND

The history of archaeological activity in the phase two portion of the study area is much more recent than phase one. The area does, however have an extensive history of "relic hunters". In the 1930's, Crocker disturbed several archaeological sites with an auger. His collection is now at the University of Maine in Orono but lacks the provenience and contextual data that archaeologists are so dependent upon to reconstruct past lifeways. The J. Bliss Goodwin Collection was recently donated to New Brunswick's Department of Historical and Cultural Resources, Archaeology Branch (Armstrong 1982). The oldest artifacts from the collection are late Palaeo-Indian (Plano) preforms, which lack the characteristic flutes of palaeo points (Deal 1984a). These were found at Pirate's Cove in the northern end of Spednic Lake. A Stark point, which dates to the Middle Archaic and is similar to projectile points from the Neville Site (Dincauze 1976) is also in the Pirate Cove assemblage. These artifacts suggest at least an 8,000 year occupation of the area.

A collection of artifacts was also donated by Raymond and Margaret Lounder (Allen 1983a). Discussions with present day collectors in the study area proved instrumental in designing the 1984 field survey program. "These persons contributed information that can only be gained through years of exploring with a natural appreciation for a particular area" (Ibid iii).

Between 1967 and 1972 sites on the area were recorded by Dr. David Sanger, then affiliated with the National Museum of Man, Canada. J. Bliss Goodwin's artifacts were photographed and his "sites" assigned Borden numbers. Mr. Goodwin kept a diary of locational data pertaining to each artifact as he surface collected. An initial survey of the Chipneticook Lakes (Allen 1983) led to the excavation of three sites in the present study area. Diggity BjDu 17, Diggity Beach BjDu 4 and Mud Lake Stream BkDw 5 (Deal 1984a,b,c,) represent an occupational sequence on the lakes from approximately 4000 years ago to the present. Mud Lake Stream has the earliest radio-carbon date in New Brunswick (Deal 1984c).

Surveys have also been conducted on the American side of the study area (Carlson 1981, Kopec 1984) Private collectors are also active on the American side. Based on the known sites to date, Kopec (1984) suggests that there are more intact sites on the Canadian than American side. At present, one can only speculate whether this is due to preferential settlement, differential erosion or discriminant survey.

Erosion of sites in the study area is due to a variety of factors. Fluctuating water levels, lake orientation, wind direction and ice action contribute to severe erosion.

PHASE TWO

ARCHAEOLOGICAL ANALYSIS

Several sites had already been recorded for this portion of the study area (Sanger n.d.). In most cases these sites had been plotted on the appropriate 1:50,000 topographic map, but no other information was available. Often it was impossible to visit the sites as surveys were conducted in the spring when many sites were underwater. During the 1984 survey and testing program, 32 sites were assessed and an additional seven sites were assigned Borden numbers. Almost 50% of the previously recorded sites examined during the low water (late fall) seasons of 1984 revealed no surficial evidence, whatsoever. All sites except, BjDv 16, Skedaddle Ridge exhibited erosion. Therefore the analysis of the phase two portion of the study area is presented somewhat differently from that of phase one. Individual sites are not discussed. The attempt to quantify this surface collection with so many "sites" involved has been solved by dividing the artifacts into groups and discussing them rather than specific sites. Sites can be divided into three broad categories. The first situation is one where artifacts are exposed to the surface by erosional factors which have caused the removal of the soil matrix (Plate 9). Secondly

are the sites which artificially controlled water levels have covered with water, i.e. innundated sites (Plate 10). In the third case, sand and/or gravel is built up and artifacts are redeposited on recently formed sand beaches (Plate 11) or gravel bars (Plate 12). These three site types emphasize the lack of archaeological context involved in the collection of artifacts in the phase two portion of the study. The lack of provenience is compounded by the popular local hobby of relic hunting. Erosion of soil matrix and intact sites prevents the archaeologist from applying various analytical techniques. The faunal remains collected during the survey were unidentifiable because of poor preservation. Botanical specimens were not collected because of the general lack of soil matrix on the surveyed sites. Similarly, no ceramic fragments were encountered during the survey.

HISTORIC RESOURCES

The history of the phase two portion of the study area is summarized by Deal (1984a). Four historic artifacts are discussed and then the historic site of Skeddaddle Ridge (BjDv16). Two recent historic artifacts are a key and small link chain (BjDv1:13) and a larger link chain (BjDv4:1). These may relate to lumbering activities on the lake in the past century.

A fragment of a red ceramic pipe bowl was surface collected at Todd's Island (BjDu8:1). This historic artifact is particularly interesting since the ten pipe fragments collected to date on the lakes have all been made of white clay. Red clay pipes were produced in Glasgow, Scotland (Walker 1977:388). The United States was a major market for Glasgow pipes (Ibid:335). American made pipes were often of redware (Faulkner 1980). Whether the pipe was made locally in the New World or imported from Scotland is difficult to ascertain with the available information. A small percentage of the clay pipe inventory from seventeenth century sites in Maine is red (Ibid:34). According to Walker (1971:19) pipe trade to the New World was largely over by 1891. Therefore it is possible that the pipe represents a copy of a Scottish pipe manufactured locally in Maine or an import from Glasgow.

One gunflint (BkDw9:3) was encountered during the survey. It is a dark brown translucent rectangular shaped pistol gunflint of English origin (Witthoft 1966, Blanchette 1975, Karklins 1981). On eighteenth century colonial and revolutionary sites (be they British or American) the vast majority of gunflints are French since they are considered to be superior in quality to the English variety (Hume 1970:219). One French gunflint was identified in the J. Bliss Goodwin collection (Deal 1984a). By the war of 1812, the British were using as many English as French flints and in the first half of the nineteenth century both British and American traders were only

selling the English product (Hume 1970). Native-made flints were also manufactured by Indians who applied their chipped stone tool technology to the task at hand. (Kent 1983). On the basis of the ratio of gunflints found to date, one could suggest that those flints predate the war of 1812 but because of the small sample and lack of associated artifacts it is only possible to determine an approximate date range for the flint. English flints were predominantly used in the first half of the nineteenth century (Karklins 1981) although they first appeared in 1775 or 80 (Witthoft 1966:36).

Skedaddle Ridge BjDv 16

Skedaddle Ridge is the only site worthy of further investigation in the phase two study area. It is located on the Canadian or northern side of Spednic Lake in York County. It was settled during the American Civil War in 1863 or 4 by draft dodgers of the Union Army (Ganong 1899:99, MacNutt 1963). The ridge is overgrown with trees but the cellars of the "skedaddlers" are still visible. Ken Reid and the St. Stephen Cadet Corps visited the site in the summer of 1984 to tour the small settlement, locate structures and expose the cadets to a part of their New Brunswick heritage. While this was not a professional survey, the flagging tape which indicated features proved most useful when the site was assessed later in the fall by archaeologists. An iron stove with a date of 1857 was observed near one of the cellars. The

site is approximately 2 kilometers along Georgia-Pacific Corporations Route 331 and extends at least 200 meters west and 250 meters east of the lumbering road (Figure 5). Skedaddle Ridge, or Musquash as it is also known locally, was settled by approximately a dozen families including a minister and a teacher. Information was obtained through local informants, the 1871 York County census and the 1984 field reconaissance. From the agricultural crops listed in the census, it appears that the community was self-sufficient. Rock piles and fences are evidence of the effort involved in land clearing. Local lore says that a school teacher, Mary Conrad, is buried in the graveyard on the Ridge. This cemetery was relocated during logging operations in the 1930s. Several flagstones are propped up against trees in a small rectangular clearing (2.0 m x 3.0 m). There are no markings on the "tombstones" to identify the buried. Apparently the settlement was only used for about ten years. After the American Civil War was over, many of the families abandoned their political refuge, returned to the United States or became integrated into the Canadian community. This sealed time-capsule has the capacity to provide archaeologists and historians with an excellent opportunity to study a segment of New Brunswick history which has virtually been neglected until now. The site has been protected for the last century by its isolation. An orthographic photograph has been reduced to show evidence of the actual site area (Figure 6). Unfortunately Georgia-Pacific Corporations plans to selectively cut the Ridge in the spring of 1985.

Prehistoric resources

The prehistoric artifacts are discussed in two broad categories. The ground stone tools are represented by a single celt. Chipped stone tools are divided into the projectile points, bifaces and scrapers. The survey surface collection also contained 391 flakes, 10 retouched flakes with cutting or scraping edges, 10 core fragments, and 3 cores, which are not further discussed within.

BjDu7:10

This specimen is a portion of a celt (Plate 3). The sides are nearly parallel, flaring out toward the bit end. The celt is made of a "light green to gray green material, weakly foliated with original clastic, tuffaceous texture almost completely obliterated by recrystallization and development of foliation. The foliation parallels the largest surface of the specimen " (Poole and Turay 1973:158-9). Similar celts occur at other locations on the lakes (Allen 1983a, Armstrong 1982, Deal 1984 a,b,c, Kopec 1984) and at Cow Point (Sanger 1973) in southeastern New Brunswick. Chipped and then ground celts are common throughout the Ceramic and Archaic periods.

There are three complete projectile points and one diagnostic basal portion from the surface collection which are elaborated upon below. For an overview of all the projectile points and portions please refer to Table 1.

BjDu1:3

This large side notched point is from Varney Island. The point is characteristic of the Moorehead Complex of the Archaic period. Varney Island is rumoured to have been one of Crocker's sites. There are four similar points from the island in the J. Bliss Goodwin collection. Comparable points are also present at the Cow Point site, New Brunswick (Sanger 1973 and) in Assemblage 2 at Hirundo, Maine (Sanger et al 1979) and Otter Creek points in Vermont and New Hampshire (Snow 1980). (Plate 14a)

BjDu8:2

This expanding stem projectile point is similar to Deal's (1984b) Biface series, group 3. The point has wide side notching and convex blade edges. It was probably used in the Archaic or Ceramic period. (Plate 14b)

BjDv4:2

This specimen is the basal portion of a straight stemmed projectile point. It is perhaps impossible to imagine exactly what the rest of the point looked like but points with similar base froms occur at Mud Lake Stream (Deal 1984c) and Turner Farm in Maine (Sanger 1979:63) and date to the Susquehanna period of the Archaic (Snow 1980:247). (Plate 14c)

BjDv 4:5

This tiny corner notched projectile point is from the Sandy Point Site which also yielded several small scrapers and nondiagnostic projectile point tips. The site probably dates to the late Ceramic period (Plate 14d).

Less diagnostic bifaces are discussed below.

BjDu24:2, BjDv6:10, BjDu6:1

These three specimens are large formed bifaces characterized as bifacially shaped and approximately twice as long as they are wide. Edge angles vary considerably from 50-80 degrees. BjDv6:10 has a distinctive twist with the middle portion to base being thicker then the tip. (Plate 15 a,b,c,).

BjDv2:6

This specimen could fit into the category described above but it is more leaf shaped than the other three bifaces. It probably served as both cutting and scraping implement during the Ceramic period.(Plate 15d)

BjDu23:1

This rhyolite biface was discovered with a large collection of flakes of the same raw material on an eroded boulder strewn beach. Few artifacts of this raw material have been recorded for the Chipneticook-St. Croix area but this may be due to the fact that it is difficult to distinguish from felsite (Plough 1960:15) and may have been previously catalogued as the latter. (Plate 15e)

BjDu20:1

This speciman is a small reworked jasper biface with a drill like tip (Plate 15f).

Six scrapers were surface collected. One was catalogued as BjDu 17:307 since it was collected by the Mud Lake Stream crew when obtaining a soil sample. The other five are described below.

BjDv7:11

This scraper is large and steep edged. It is circular with a rounded top and the steeply bevelled cutting edge occupies about 1/3 of the circumference. Such scrapers date to the early Ceramic period of the Oxbow Site in northeastern New Brunswick (Allen 1981). (Plate 16a)

BjDu24:1

This specimen has a rectangular shape. It may have been used during the Ceramic or Archaic period to scrape down shafts or handles of wood. (Plate 16 b)

BjDv 4:11,12,13

These threee small scrapers are from the Sandy Point Site and are probably from the late Ceramic period since scrapers became smaller and more frequent after 1000 B.P. (Sanger 1979) (Plate 16 c,d,,f)

BjDv 4:30

This specimen is identical in shape to BjDu 17:307 but differs in raw material. These scrapers were probably also used during the Ceramic period (Plate 16e).

The diagnostic artifacts discussed in the past section bear witness to the Late Archaic and Ceramic periods of occupation on the lakes. Tables 1, 2 and 3 also provide data on artifacts. Mud Lake Stream (Deal 1984c) on Spednic Lake and the Diggity Site in Palfrey Lake (Deal 1984b) provide further details of these occupational periods. From the number of sites on the lakes it appears that the settlement pattern may

have consisted of central-based wandering. There appear to be many small temporary campsites on the lakes. These sites are particularly vulnerable to erosion because of their size limitations and seasonal occupations.

CONCLUSIONS

The 1984 survey program inventoried two geographic phases of the St. Croix River and Spednic and Palfrey Lakes. In phase one, BhDt-4 was tested and an attempt to quantify erosion over the past century was made. Six other sites were inventoried and assessed. In phase two, surface collections were analyzed from a total of 39 sites. Skedaddle Ridge BjDv-16 exhibited no erosion because of its location, but will be threatened when selective cutting occurs in the near future. Historic and prehistoric resources revealed erosional disturbances in both phases of the study.

RECOMMENDATIONS

From Phase one of the 1984 survey, Hills Point Depression, site BhDs-3 may warrant further testing, but the site is in a location which is in no immediate threat of erosion or human disturbance.

An aerial examination of the St. Croix drainage did not reveal favourable site locations, but the area from Upper Mills to St. Croix between phase one and two in this 1984 survey should be checked.

The final recommendation concerns Skedaddle Ridge (BjDv16). This sealed time-capsule of history could be used as a testing ground for archaeological techniques or a field school for training heritage conscious students. The site should be surveyed and features to be avoided during selective cutting should be staked out. Such an undertaking would require a substantial allotment of time and several individuals considering the total area of the site is 1,100,000 square meters. Features such as the cemetary, cellars and wells would be given higher priority than cleared fields in terms of preservation. Optimally, the site should be saved for future investigation, but the economic potential of the site is such that Georgia Pacific Corporations cannot delay operations indefinitely.

The areas in phase two which have not been surveyed to date are listed and should be examined at low water season:

-- from BkDw1 to Hinkley Point
-- from BjDv15 to Sandy Point (BjDv4)
-- from the Nubbles (BjDv6) to Palfrey Lake thoroughfare (BjDu16) including Silas Cove (BjDv12)

Figure 1 - St. Croix Survey 1984

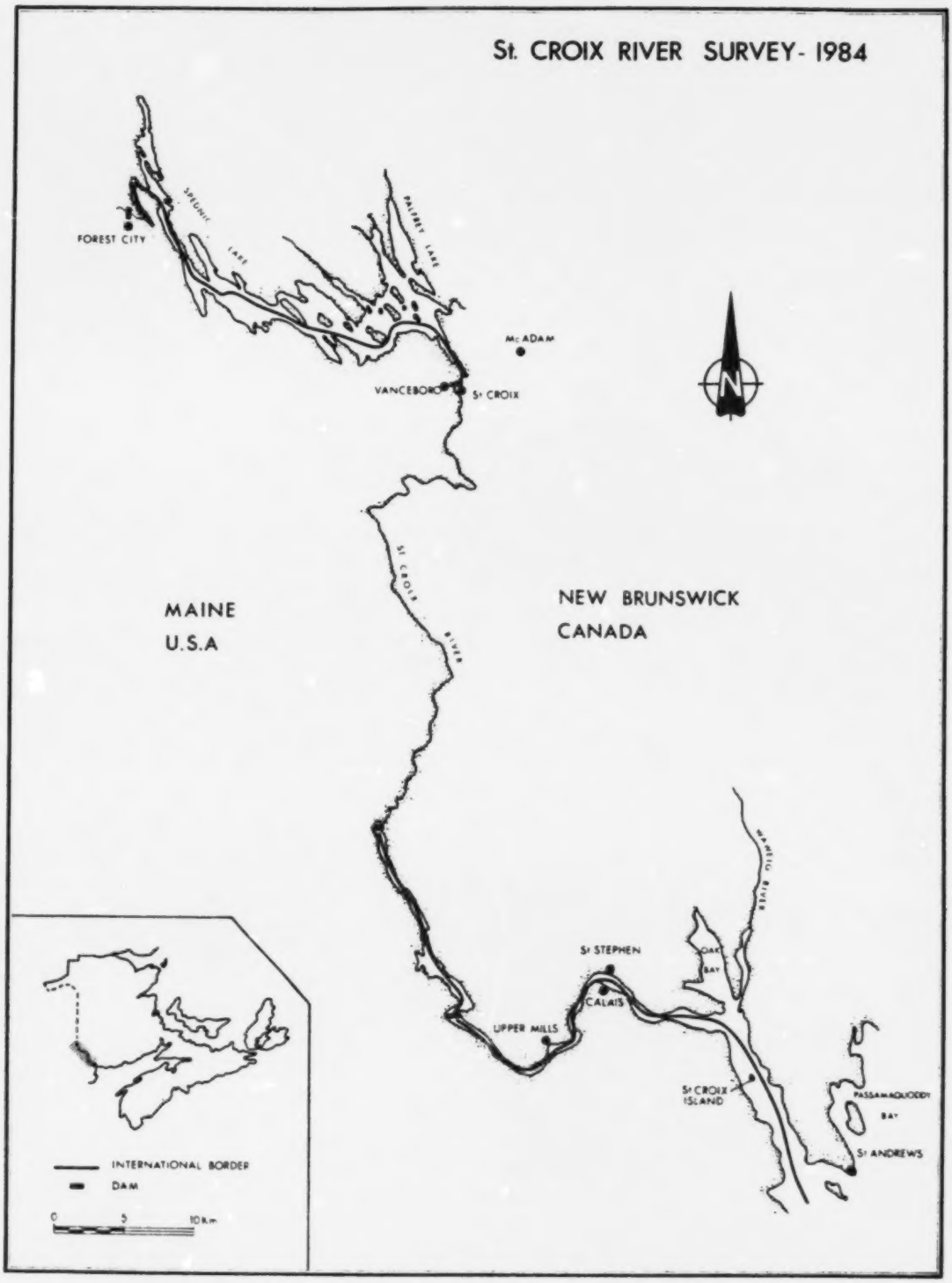

St. CROIX RIVER SURVEY- 1984
FOREST CITY
SPENCER LAKE
PALFREY LAKE
McADAM
VANCEBORO
St CROIX
N
MAINE
U.S.A
NEW BRUNSWICK
CANADA
St CROIX RIVER
MAGAGUADAVIC RIVER
St STEPHEN
OAK BAY
CALAIS
UPPER MILLS
St CROIX ISLAND
PASSAMAQUODDY BAY
St ANDREWS
INTERNATIONAL BORDER
DAM
0
5
10 Km

Figure 2 - St. Croix Survey 1984 - Phase 1

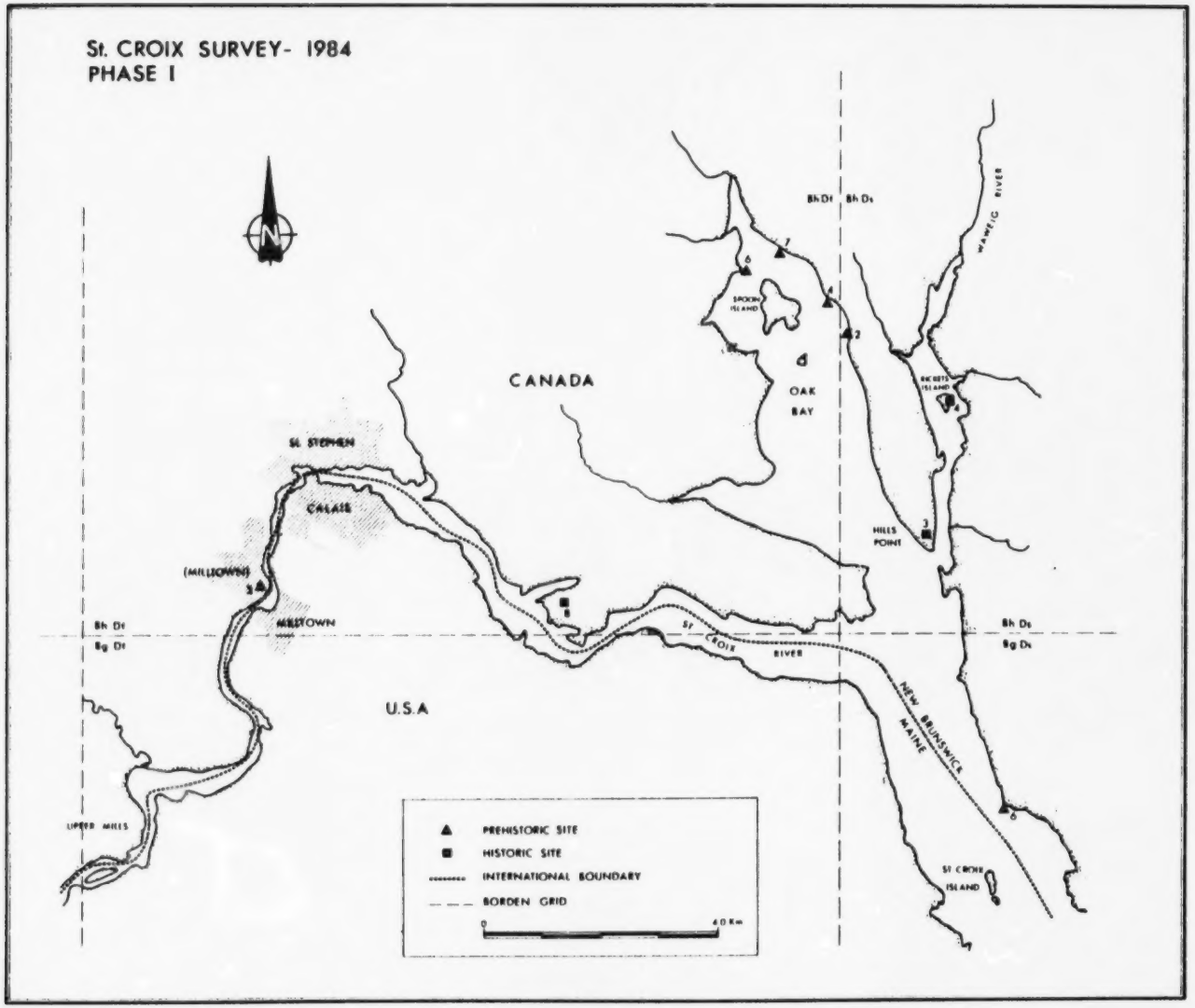

St. CROIX SURVEY- 1984
PHASE I
N
CANADA
U.S.A
OAK BAY
ST STEPHEN
CALAIS
(MILLTOWN)
MILLTOWN
HILLS POINT
ST CROIX ISLAND
UPPER MILLS
WAWEIG RIVER
ST CROIX RIVER
NEW BRUNSWICK
MAINE
PREHISTORIC SITE
HISTORIC SITE
INTERNATIONAL BOUNDARY
BORDEN GRID
0
4.0 Km

Figure 3 - St. Croix Survey 1984 - Phase 2

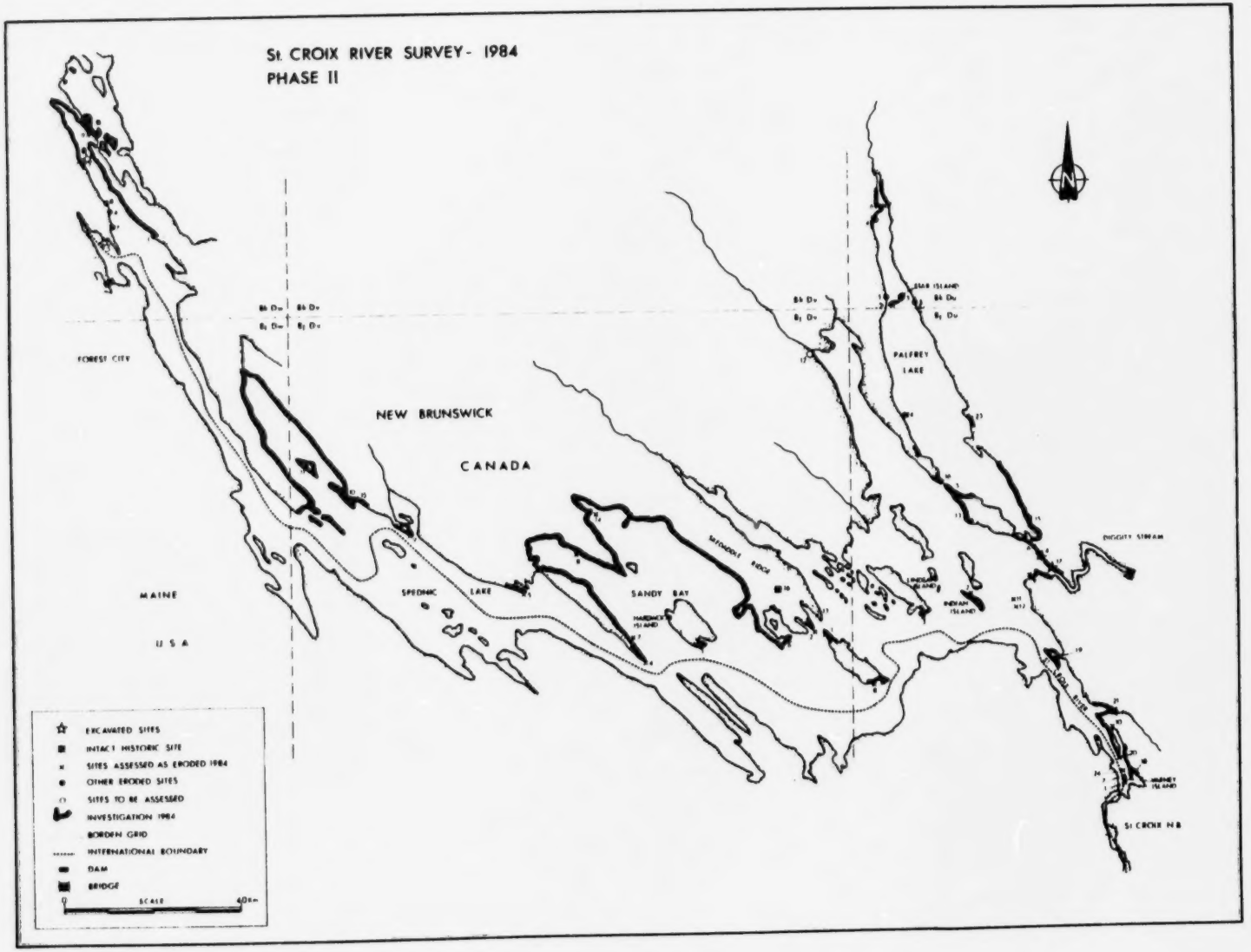

St. CROIX RIVER SURVEY - 1984
PHASE II
N
NEW BRUNSWICK
CANADA
MAINE
U S A
FOREST CITY
PALFREY LAKE
SPEDNIC LAKE
SANDY BAY
INDIAN ISLAND
EXCAVATED SITES
INTACT HISTORIC SITE
SITES ASSESSED AS ERODED 1984
OTHER ERODED SITES
SITES TO BE ASSESSED
INVESTIGATION 1984
BORDEN GRID
INTERNATIONAL BOUNDARY
DAM
BRIDGE
SCALE

Figure 4 - BhDt-4 Shell Midden

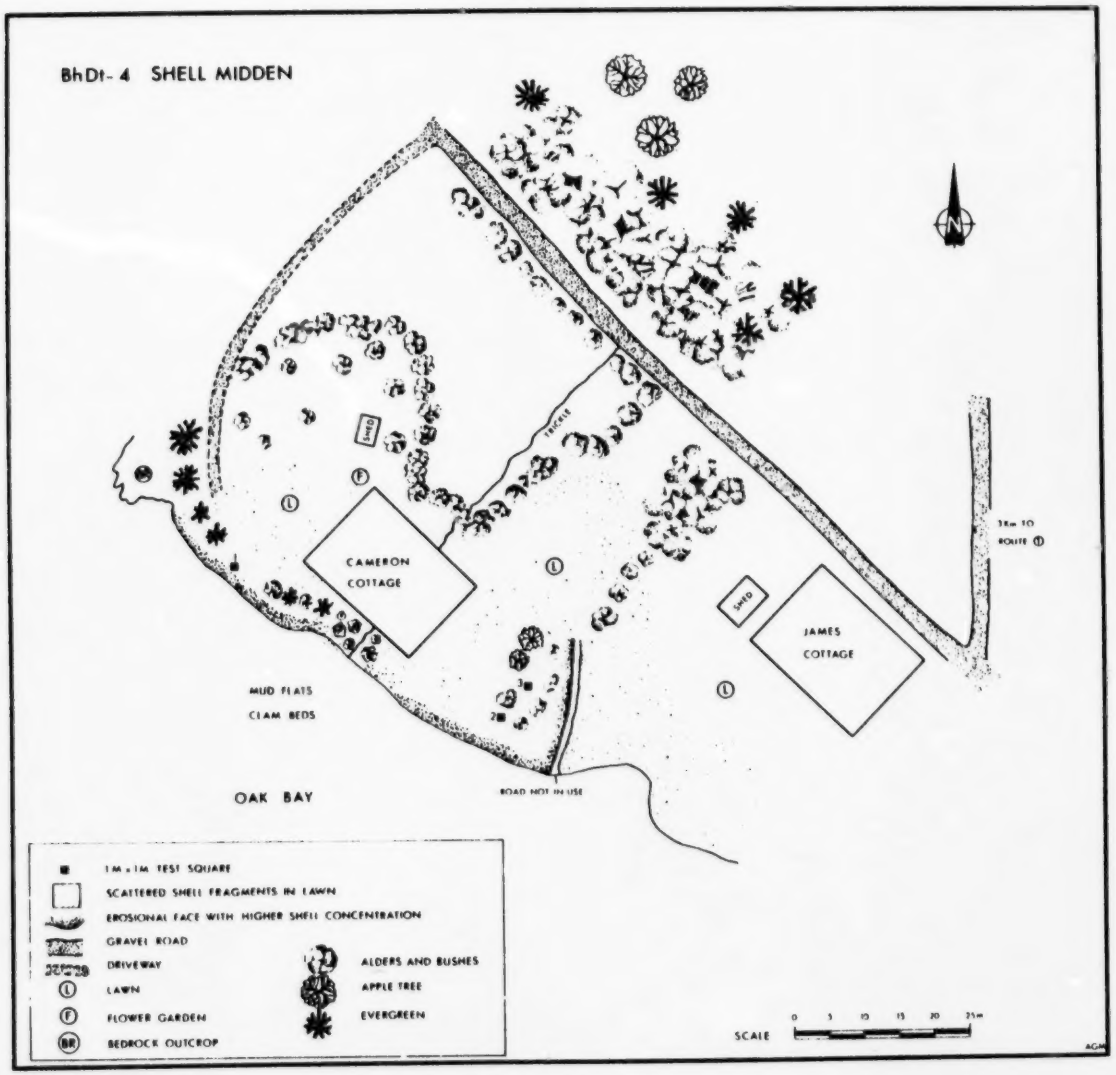

BhDt-4 SHELL MIDDEN
N
CAMERON COTTAGE
JAMES COTTAGE
SHED
SHED
TRENCH
MUD FLATS
CLAM BEDS
OAK BAY
ROAD NOT IN USE
TO ROUTE 1
1M x 1M TEST SQUARE
SCATTERED SHELL FRAGMENTS IN LAWN
EROSIONAL FACE WITH HIGHER SHELL CONCENTRATION
GRAVEL ROAD
DRIVEWAY
LAWN
FLOWER GARDEN
BEDROCK OUTCROP
ALDERS AND BUSHES
APPLE TREE
EVERGREEN
SCALE
0 5 10 15 20 25m

Figure 5 - BjDv-16 Skedaddle Ridge

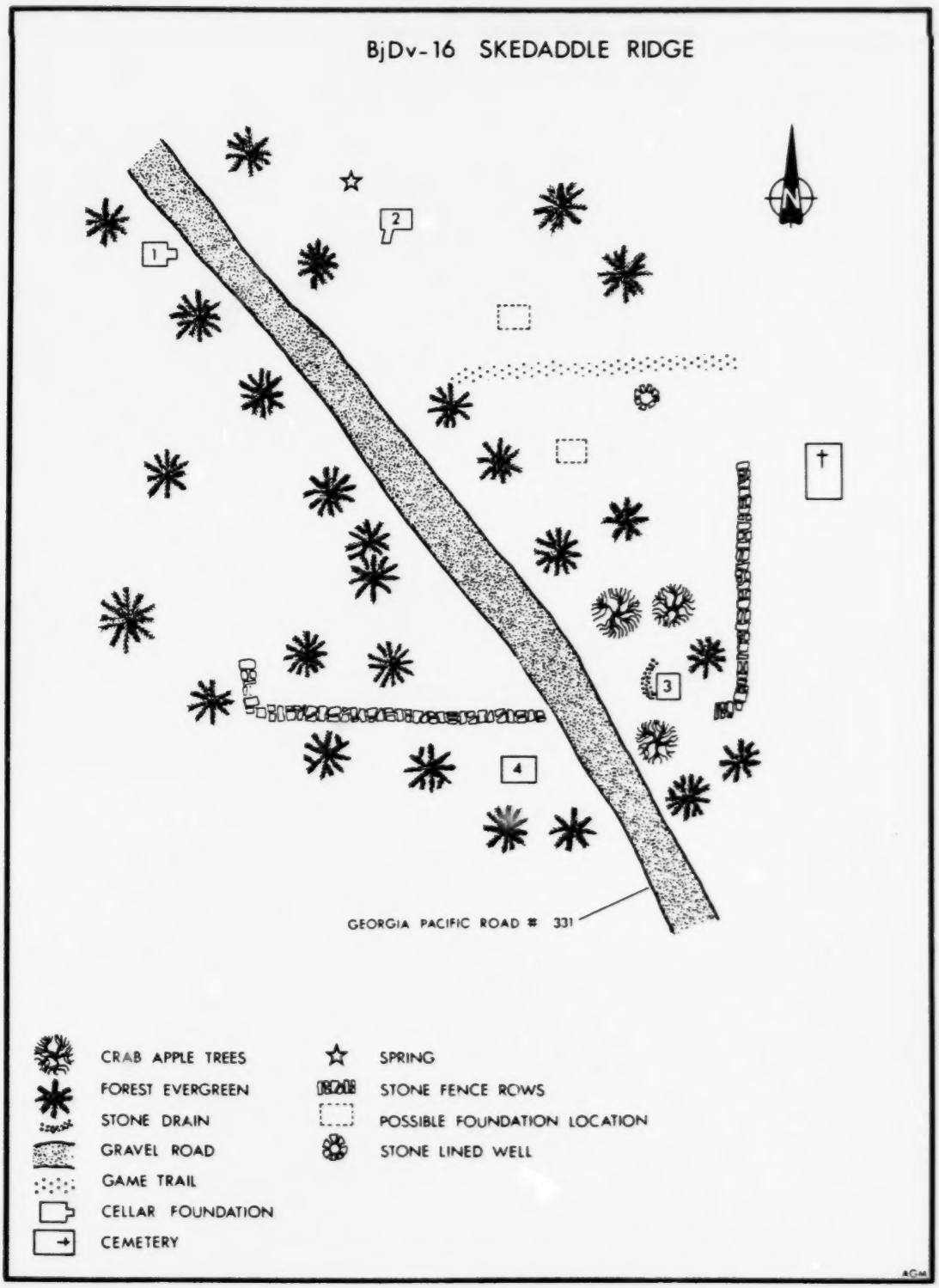

BjDv-16 SKEDADDLE RIDGE
N
1
2
3
4
GEORGIA PACIFIC ROAD # 331
CRAB APPLE TREES
FOREST EVERGREEN
STONE DRAIN
GRAVEL ROAD
GAME TRAIL
CELLAR FOUNDATION
CEMETERY
SPRING
STONE FENCE ROWS
POSSIBLE FOUNDATION LOCATION
STONE LINED WELL
ACM

Figure 6 - BjDv-16 Skedaddle Ridge Site Area

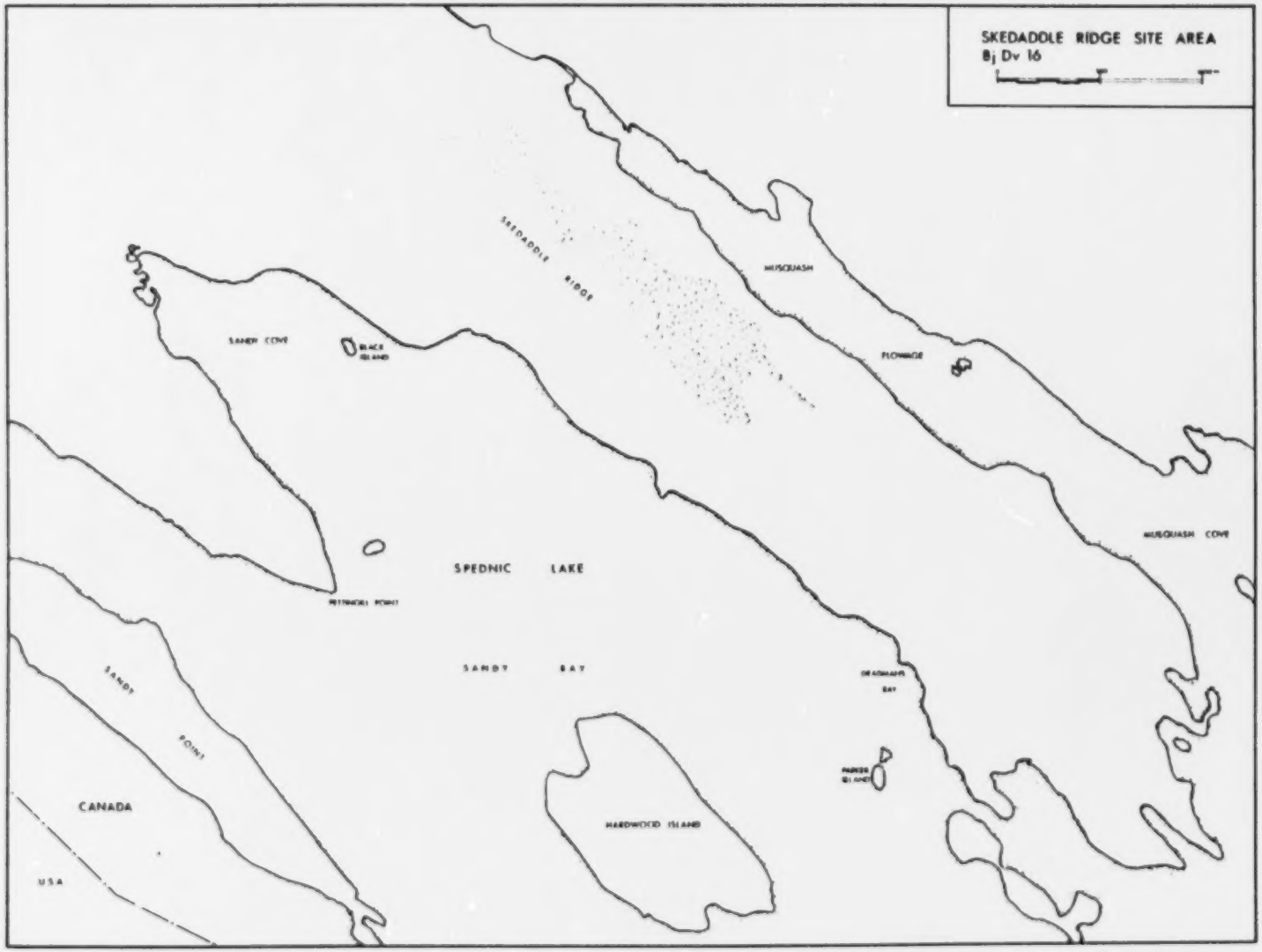

SKEDADDLE RIDGE SITE AREA
Bj Dv 16
SKEDADDLE RIDGE
MUSQUASH
SANDY COVE
BLACK ISLAND
FLOWAGE
MUSQUASH COVE
SPEDNIC LAKE
SANDY BAY
SANDY POINT
CANADA
USA
HARDWOOD ISLAND

TABLE 1

Zoological Remains Represented at Simpson's Farm
BhDt-4 (in order of discussion)

SCIENTIFIC NAME	COMMON NAME
Strongylocentrotus droebachiensis	Sea urchin
Buccinum undatum	waved whelk
Natica heros	moon shell
Pecten grandis	deep sea scollop
Pecten irradians	scallop
Mytilus	mussels
Mya arenaria	soft-shelled clam
Castor canadensis	beaver
Ursus americanus	black bear
Alces Alces	moose
Canis, probably *canis familiarus*	dog
Pleuronectiformes family *Bothidae* or *Pleuronectidae*	flounder

TABLE 2

PROJECTILE POINTS	Maximum Length(mm)	Base Width (mm)	Maximum Thickness(mm)	Portion	Raw Material	Weight(g)
BjDv4:5	34.1	21.2	8.7	complete corner notched	jasper	2.4
BjDu8:2	69.7	21.3	12.3	complete expanding stem	bleached chert	14.9
BjDu1:3	100.25	21.8	12.1	complete side notched	bleached chert	22.2
BjDv4:6	45.0	22.8	11.4	tip only	jasper	4.7
BjDv4:10	40.4	29.8	10.2	tip only	felsite	5.1
BjDv4:9	25.0	19.9	9.6	tip only	gray hertz quartzite	1.6
BjDv4:8	31.5	30.5	11.3	tip only	bleached chert	2.3
BjDv4:7	30.6	20.2	7.0	tip only	cherty quartzite	1.3
BjDv4:2	23.3	18.5	10.1	base only stemmed	bleached chert	2.3

TABLE 3

FACES	Edge Angles Left	Right	Base	Maximum Length	Maximum Width	Weight	Raw Material
jDv4:15	50°	50°	60°	6.1mm	45.0mm		felsite
jDv6:10	60°	80°	70°	100.8mm	41.8mm	34.9g	bleached chert
jDv2:6	50°	60°	50°	58.4mm	31.15mm	13.2g	bleached chert
jDv24:2	70°	60°	80°	97.7mm	41.5mm	63.4g	banded chert
jDv6:1	80°	60°	60°	87.8mm	31.4mm	31.6g	bleached chert
jDv7:9	50°	60°	60°	88.4mm	55.4mm	70.5g	banded chert
jDv7:8	60°	90°	60°	59.22mm	32.2mm	23g	cherty quartzite
jDu20:1	80°	40°	40°	34.4mm	21.2mm	2.7g	jasper
jDu23:1	50°	40°	n/a	58.5mm	27.75mm	105.g	rhyolite

TABLE 4

SCRAPERS	distal	proximal	left	right	shape	material	weight(g)
BjDv7:11 span(mm)	39.3	24.2	55.3	51.2	whole	basalt	69.0
thickness(mm)	13.3	18.2	15.25	26.3	triangular		
edge angle	90°	90°	90°	80°			
BjDv4:11 span(mm)	26.3	23.3	21.7	24.4	whole	red chalcedony	5.2
thickness(mm)	15.3	6.8	13.0	13.3	rectangular		
edge angle	50°	40°	90°	80°			
BjDv4:12 span(mm)	25.8	n/a	n/a	n/a	fragmentary	basalt	
thickness(mm)	11.5	n/a	n/a	n/a			
edge angle	90°						
BjDv4:13 span(mm)	22.4	17.2	22.7	11.0	whole	brownish	5.7
thickness(mm)	12.5	13.6	12.3	5.9	rectangular	cherty quartzite	
edge angle	90°	70°	60°	60°			
BjDv4:30 span(mm)	15.00	24	13.8	21.1	whole	light gray chert	1.6
thickness(mm)	8	9.5	7.55	9.4	triangular		
edge angle	80°	30°	60°	80°			
BjDu17:307 span(mm)	27.35	23.8	29.0	25.1	whole	gray quartzite	7.5
thickness(mm)	8.1	12.0	10.8	13.5	rectangular		
edge angle	80°	90°	90°	80°			
BjDu24:11 span(mm)	27.9	19.3	44.55	46.25	whole	bleached chert	15.4
thickness	13.4	11.4	12.65	12.6	rectangular		
edge angle	70°	80°	70°				

Plate 1 High tide on the St. Croix Estuary

Plate 2 Low tide on the St. Croix Estuary

Plate 3 Measures to prevent coastal erosion on St. Croix estuary

Plate 4 Looking west at mudflats and McVicar Island from BhDt-4

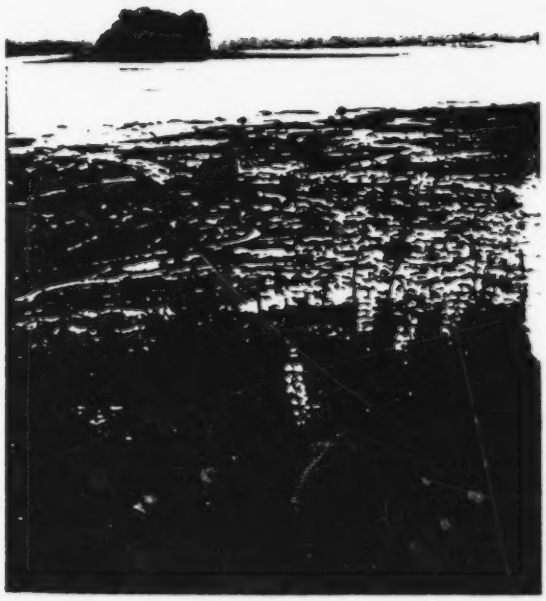


Plate 5 BhDt-4 Ceramics

Plate 6 BhDs-2 Gilman Farm

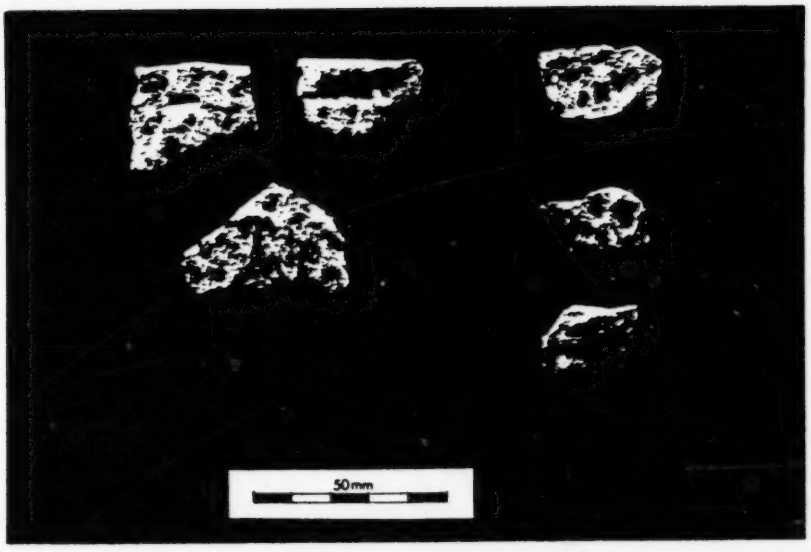

50 mm

Plate 7 Breshnahan collection from BhDt-3, Salmon Falls

Plate 8 Palfrey Lake throughfare, facing Spednic Lake

50mm

Plate 9 BjDv-4, Sandy Point - category one

Plate 10 BjDv-5, Norway Point - category two

Plate 11 BjDv-6, Maggie's Oxbow - category three

Plate 12 BjDv-2, Todd's Island - category three

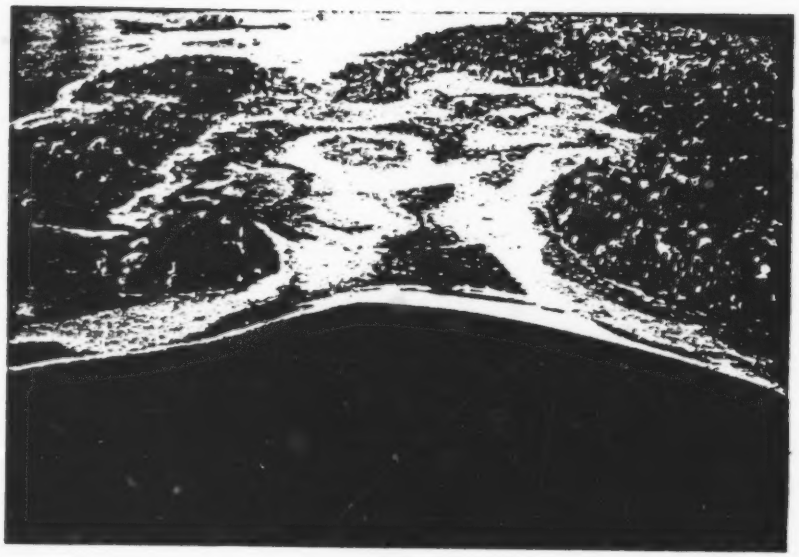
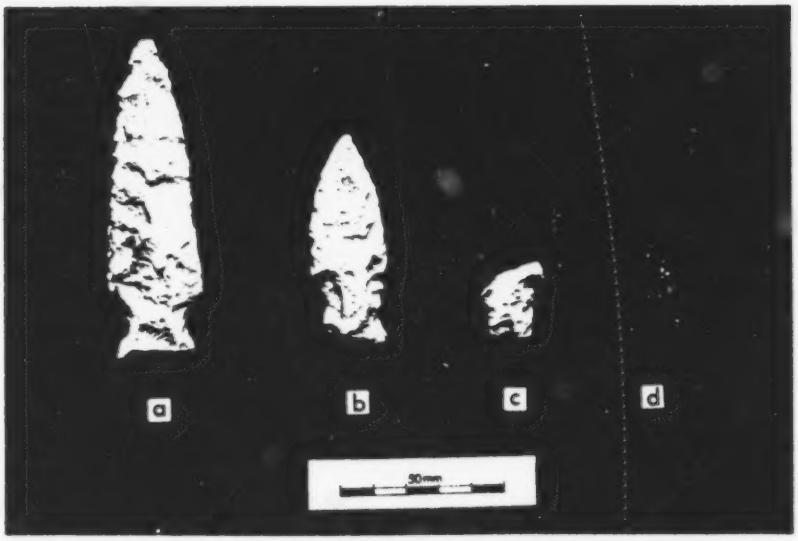


Plate 13 BjDu 7:10 Celt

Plate 14 Phase Two Projectile points

50mm


a
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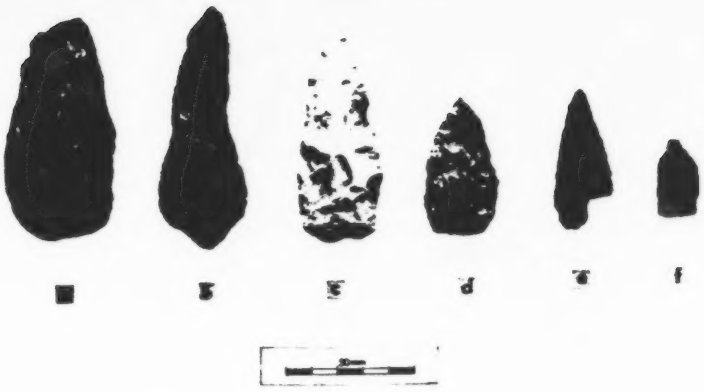
50mm

Plate 15 Phase Two Bifaces

Plate 16 Phase Two Scrapers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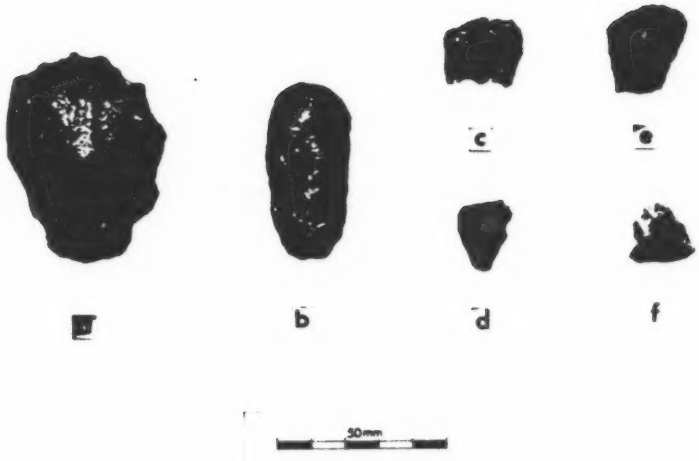
a
b
c
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50mm

REFERENCES CITED

Allen, Patricia

1981 The Oxbow site: chronology and prehistory in Northeastern New Brunswick. New Brunswick Manuscript in Archaeology (1/2). Department of Historical and Cultural Resources, Fredericton.

1983a The St. Croix Waterway Area 1982 archaeological survey. Manuscripts in Archaeology 3, Department of Historical and Cultural Resources, Fredericton.

1983b Ceramic period settlement/subsistence practices in the Miramichi River District of Northeastern, New Brunswick. Paper presented at the Canadian Archaeo- logical Association, Halifax.

Armstrong, Beth

1982 An artifact analysis of the JBG collection. Unpublished B.A. Honours thesis, Department of Anthropology, University of New Brunswick.

Baird, S. F.

1881 Notes on certain aboriginal shell mounds on the coast of New Brunswick and New England. Proceedings of the U.S. National Museum 4, Washington.

Banfield, A.W.F.

1974 The mammals of Canada. University of Toronto Press, Toronto.

Bishop, Jennifer C.

1980 Phil's Beach: an artifact analysis and comparative study. Unpublished Honours thesis, Department of Anthropology, University of New Brunswick, Fredericton.

1983 The Partridge Island sites: Early and Middle Woodland-related assemblages in Passamaquoddy Bay. Unpublished M.A. Thesis, Department of Anthropology, McMaster University.

Black, David W.

1982 A preliminary report on the faunal remains of BgDr-48: a shell midden on Partridge Island, New Brunswick. Ms. on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

1983 What images return: a study of the stratigraphy and seasonality of a small shell in the West Isles of New Brunswick. Unpublished M.A. Thesis, Department of Anthropology, McMaster University.

1984 Living in Bliss: an introduction to the archaeology of the Bliss Islands group, Charlotte County, New Brunswick. Manuscript on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton, New Brunswick.

Blanchette, Jean-François
1975 Gunflints from Chicoutimi Indian site (Québec). Historical Archaeology 9:41-54.

Boardman, S. L.
1983 The naturalist of the St. Croix. Charles H. Glass, Bangor.

Bonnichsen, Robson; Bruce Bourque, and David E. Young
1983 The Moosehorn fluted point discovery, Northern Maine. Archaeology of Eastern North America 11:36-48.

Bonnichsen, Robson, and David Sanger
1977 Integrating faunal analysis. Canadian Journal of Archaeology 1:109-133.

Bradstreet, T. E., and R. B. Davis
1975 Mid-postglacial environments in New England with emphasis on Maine. Arctic Anthropology 12(2):7-22.

Brookes, Ian
1972 Physical geography of the Atlantic provinces. In Studies in Canadian Geography: the Atlantic provinces, edited by Alan G. Macpherson, pp. 1-45. University of Toronto Press.

Burns, James A.
1978 The faunal remains of Teacher's Cove. In Teacher's Cove, by Stephen A. Davis, Appendix 1, pp. 36-39. New Brunswick Archaeology, Series 1(1). Department of Historical and Cultural Resources, Fredericton.

Carlson, Catherine
1981 Report on archaeological survey of the Georgia-Pacific Corporations Timber Haul road along the west bank of the St. Croix River between Woodland and Vanceboro, Maine. Ms. on file, University of Maine at Orono, Institute of Quarternary Studies.

Christie, David S.
1983 Birds. In Marine and coastal systems of the Quoddy region, New Brunswick, edited by Martin L.H. Thomas, pp. 215-229. Canadian Special Publications of Fisheries and Aquatic Sciences 64. Department of Fisheries and Oceans, Ottawa.

Cumming, L. M.
1966 Geology of the Passamaquoddy Bay region, Charlotte County, New Brunswick. Geological Survey of Canada, Paper 65-29. Department of Energy, Mines, and Resources Canada.

Davis, Harold A.
1974 An international community on the St. Croix (1604-1930). University of Maine Studies, Second Series 64, The Maine Bulletin 52(12). University Press, Orono.

Davis, Stephen A.
1978 Teacher's Cove. A prehistoric site on Passamaquoddy Bay. New Brunswick Archaeology Series 1, Number 1, Archaeology Branch, Historical and Cultural Resources, Fredericton.

Davis, Stephen A., and David Christianson
1981 Archaeological resources of the Maritimes - a coastal survey - 1979. Council of the Maritime Premiers, Report in Archaeology 4, Fredericton.

Deal, Michael
1984a The archaeological significance of the Chiputneticook-St. Croix Drainage System. Archaeology Branch, Historical and Cultural Resources Administration, Fredericton.

1984b Diggity (BjDu-17): a Ceramic period site on Spednic Lake, Southwestern New Brunswick. Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

1984c Susquehanna and ceramic period occupation of Mud Lake Stream (BkDw5), southwestern New Brunswick. Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

Denys, Nicolas
1908 The description and natural history of the coasts of North America (Acadia), translated and edited by W. F. Ganong. The Champlain Society, Toronto.

Dincauze, Dena F.
1976 The Neville Site. 8,000 years at Amoskeag, Manchester, New Hampshire. Harvard University, Peabody Museum Monographs 4.

Erskine, John S.
1968 Indian research in N. B., Maine, etc. - summer of 1968. Ms. on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

Faulkner, Alaric
1980 Identifying clay pipes from historic sites in Maine: some rules of thumb. Maine Archaeological Society Bulletin 20(1):17-49.

Ferguson, Albert, and Christopher Turnbull
1980 Minister's Island seawall: an experiment in archaeological site preservation (management). In Proceedings of the 1980 conference on the future of archaeology in the Maritime provinces, edited by Daniel M. Shimbuku, pp. 88-94. Department of Anthropology, Saint Marys University, Occasional Papers in Archaeology 8.

Gadd, N. R.
1973 Quaternary Geology of southwest New Brunswick with particular reference to the Fredericton area (21G). Geological Survey of Canada, Paper 71-34.

Ganong, William F.
1899 A monograph of historic sites in the province of New Brunswick. Contributions to the history of New Brunswick, no. 4, Transactions of the Royal Society of Canada, Section 2, 1899.

1903 Champlain's Island. Transactions of the Royal Society of Canada, Second Series 8(2).

1904 A monograph of the origins of settlement in the province of New Brunswick. Transactions of the Royal Society of Canada, Volume 10, Section 2, pp. 3-185.

Gaskin, David E.
1983 The Marine Mammal community. In Marine and coastal systems of the Quoddy region, New Brunswick, edited by Martin L. H. Thomas, pp. 245-268. Canadian Special Publication of Fisheries and Aquatic Sciences 64. Department of Fisheries and Oceans, Ottawa.

Grant, D. R.
1970 Recent coastal submergences of the Maritime provinces, Canada. Canadian Journal of Earth Sciences 7(2):676-689.

1977 Conference report: workshop on sea-level rise and subsidence in the Maritimes. Geoscience Canada 4(3): 144-146.

Gruber, Jacob W.
1970 The French Settlement on St. Croix Island, Maine. Excavation for the National Park Service, 1968-1969. Temple University.

Hammon, Dimity
1984 A ceramic period coastal adaptation in Holt's Point, New Brunswick. Unpublished M.A. Thesis, Department of Anthropology, University of New Brunswick.

Hancock, Mary E.
1982 The determination of archaeological site seasonality using the remains of Mya arenaria (L.) examples from the Central Maine coast. M.Sc. Thesis, Department of Quaternary Studies, University of Maine.

Hinds, Harold R.
1983 The coastal forest of the Passamaquoddy Bay area. In Marine and coastal systems of the Quoddy region, New Brunswick, edited by Martin L. H. Thomas, pp. 269-276. Canadian Special Publication of Fisheries and Aquatic Sciences 64. Department of Fisheries and Oceans, Ottawa.

Hosie, R. C.
1969 Native trees of Canada. Canadian Forestry Service, Department of Fisheries and Forestry, Ottawa.

Hume, Ivor N.
1970 A guide to artifacts of Colonial America. Alfred A. Knopf, New York.

Joudry, George Neil
1955 The archaeology of the province of New Brunswick. Unpublished M.S. Thesis, Mount Allison University.

Karlins, Karlos
1981 The Old Fort Point site: Fort Wedderburn II. Canadian Historic sites 26:209-267. National Parks and Sites Branch, Ottawa.

Keenlyside, David, and Judy Buxton-Keenlyside
1976 Tracadie: Etude de la prehistoire d'un reseau fluvial. La Revue d'histoire de la Société Historique Nicolas-Denys 4(2):8-39.

Kent, Barry C.
1983 More on gunflints. Journal of the Society for Historical Archaeology 17(2):27-40.

Kopec, Diane
1984 Phase I survey of the Chiputneticook Lakes. Ms. on file, Maine Historic Sites Commission, Augusta.

Langemann, Gwyn
1985 Analysis of the Faunal material from Mud Lake Stream Site BkDw5, and Sites along the Chipneticook-St. Croix drainage, New Brunswick. Unpublished manuscript on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

Lavoie, Jacques
1971 Le site Sandy Point (BqDs6). Unpublished M.A. Thesis, Department of Anthropology, University of Montréal.

LeClerq, Chrestien
1910 New relations of Gaspesia, with the Customs and religion of the Gaspesian Indians. Translated and edited by W. F. Ganong, Champlain Society, Toronto.

Loucks, O. L.
1962 A forest classification for the Maritime provinces. Nova Scotia Institute of Science 25(2):86-167.

MacKay, Arthur A.
1976 The sea urchin row industry in New Brunswick's Bay of Fundy coast. New Brunswick Department of Fisheries, Fredericton.

MacKay, Arthur, Robert Bosien, and B. Wells
1978 Bay of Fundy resource inventory, volume one, St. Croix River-Passamaquoddy Bay. New Brunswick Department of Fisheries (Reference NB77-1A).

MacNutt, W. Stewart
1963 New Brunswick: A history 1784-1867. MacMillan, Toronto.

Matthew, G. F.
1892 Discoveries at a village of the stone age at Bocabec, N./B. Natural History Society of New Brunswick, Bulletin (10):4-19.

McCormick, James S.
1980 Criteria in archaeological faunal analysis: four Passamaquoddy Bay cases. Unpublished M.Sc. Thesis, Quaternary Studies, University of Maine at Orono.

Morris, Percy
1951 A field guide to the shells. Houghton Miffin, Boston.

Mott, R. J.
1975 Post-glacial history and environment in southwestern New Brunswick. In Environmental change in the Maritimes, edited by J.G. Ogden, and M.J. Harvey. Proceedings of the Nova Scotia of Science 27, Supplement 3:67-82. Halifax.

Murchie, Guy
1947 Saint Croix, the sentinel river. Dull, Sloan & Perce, New York.

Pearson, Richard
1970 Archaeological investigations in the St. Andrews area, New Brunswick. Anthropogica, New Series 12(2):181-190. Ottawa.

Peterson, Lee
1978 A field guide to edible wild plants of Eastern and Central North America. Houghton Mifflin, Boston.

Petersen, James E., and Nathan D. Hamilton
1984 Early Woodland ceramic and perishable fiber industries from the Northeast: a summary and interpretation. Annals of Carnegie Museum 53 (article 14):413-445.

Plough, Frederick H.
1960 A field guide to rocks and minerals, Houghton Mifflin, Boston.

Poole, W. H. and Mariette Turay
1973 Lithological description of artifacts, Cow Point, New Brunswick. In Cow Point: An Archaic cemetary in New Brunswick, by David Sanger, Apprendix, pp. 153-174. Archaeological Survey of Canada, Paper 12, Mercury Series. Ottawa.

Rowe, J. S.
1972 Forest regions of Canada. Department of the Environment, Canadian Forestry Service, Publication 1300. Ottawa.

Ruitenberg, A. A.
1968 Geology and mineral deposits. Passamaquoddy Bay area. Mineral Resources Branch, Department of Natural Resources, Report of Investigations 7. Fredericton, New Brunswick.

Salvaggio, Rosemary
1983 Faunal analysis of the Holt's Point site (BgDr-9). Ms. on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton.

Sanger, David
1971a Prehistory of Passamaquoddy Bay - a summary. Maine Archaeological Society Bulletin 2(2):14-19.

1971b Charlotte County Prehistory. Contributions from the Charlotte County Historical Society (67):9-15.

1973 Cow Point: an Archaic cemetery in New Brunswick. National Musueum of Man, Mercury Series, Archaeological Survey of Canada, Paper 12.

1976 The earliest settlements: 9000 B.C. to 1600 A.D. In Maine forms of American Architecture, edited by Deborah Thompson, pp. 3-14. Camden, Maine.

1977 Charlotte County Prehistory. Horizons 3-1:9-19. New Brunswick Museums Association, Saint John.

1979 Discovering Maine's archaeological heritage, edited by David Sanger. Maine Historic Preservation Commission, Augusta.

1982 Changing views of aboriginal seasonality and settlement in in the Gulf of Maine. Canadian Journal of Archaeology 2(2)195-203.

Scott, W. Beverley
1983 Fishes. In Marine and coastal systems of the Quoddy region, New Brunswick, edited by Martin L.H. Thomas, pp. 156-175. Canadian Special Publication of Fisheries and Aquatic Sciences 64. Department of Fisheries and Oceans, Ottawa.

Scott. D. B., and Medioli, F. S.
1980 Post-glacial emergence curves in the maritimes determined from marine sediments in raised basins. Proceedings of the Canadian Coastal Conference, Burlington, pp. 428-446.

Seaman, A. A.
1982 Granular aggregate resources. McAdam (NTS 21 GI11) and Forest city (NTS 21 G112). Open file Report 82-14. Mineral Resources Division, Department of Natural Resources, New Brunswick.

Simonson, Bjorn O.
1978 Attrition of coastal archaeological resources in the Maritime provinces of Canada. A management study: Part 1. Council of the Maritime Premiers, Halifax.

1979 Attrition of coastal archaeological resources in the Maritime provinces of Canada. A management study: Part 2. Council of the Maritime Premiers, Halifax.

Snow, Dean R.
1980 The archaeology of New England. Academic Press.

Speck, Frank G.
1938 Aboriginal conservators. Bird-Lore 40:258-261.

Spiess, Arthur E., Bruce J. Bourque, and Steven L. Cox
1983 Cultural Complexity in Maritime cultures: evidence from Penobscot Bay, Maine. In the evolution of Maritime cultures on the Northeast and the Northwest coasts of North America, edited by Ronald J. Nash, pp. 91-108. Simon Fraser University, Department of Archaeology, Publication 11.

Stewart, Frances L.
1974 Faunal remains from the Carson site (BgDr-5) of New Brunswick. Ms. on file, Archaeology Branch, Department of Historical and Cultural Resources, Fredericton. 15(3):31-37.

Stoddard, Theodore L., Robert H. Dyson, and Natalie B. Stoddard
1952 The 1950 survey. An Archaeological survey of the Northeast. Survey reports for 1950, 51, 52, Part 1. Ms. on file, Peabody Foundation for Archaeology, Andover.

Stuiver, M., and W. H. Borns, Jr.
1975 Late Quaternary marine invasion in Maine: Its chronology and associated crustal movement. Geological Society of American Bulletin 86:99-104.

Thibault, Jacques
1982 Granular aggregate resources of Rollingdam (NTS 21 G/6) and St. Stephen (NTS 21 G/3). New Brunswick Department of Natural Resources, Mineral Resources Branch, Open file 82-15.

Thomas, Martin L. H., David C. Arnold, and A. R. A. Taylor
1983 Rocky intertidal communities. In Marine and coastal systems of the Quoddy region, New Brunswick, edited by Martin L. H. Thomas, pp. 35-73. Canadian Special Publication of Fisheries and Aquatic Sciences 64. Department of Fisheries and Oceans, Ottawa.

Turnbull, Christopher J.
1979 The state of archaeology in the Maritimes. Council of the Maritime Premiers, Reports in Archaeology 1.

Wherry, James
1981 Document relating to the history of the Passamaquoddy Indian Presence in Charlotte County, New Brunswick. Arctician Books, Fredericton.

Wicklund, R. E., and Langmaid, K. K.
1953 Soil survey of southwestern New Brunswick. Report of the New Brunswick soil survey 4. Canadian Department of Agriculture, Research Branch, Fredericton, New Brunswick.

Witthoft, John
1966 A history of gunflints. Pennsylvania Archaeologists 36(1/2:12-49.

Zaborski, Jerzy
1955 Preliminary report on the archaeological reconnaissance in New Brunswick during July-September 1955 carried out by the National Museum of Canada. Ms. on file, Archaeology Branch, Department of Historical and Cultural Resources.

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